

of device independent colors, based on a forward model look-up table whose entries represent device independent colors obtained in response to printout of corresponding device dependent color components, wherein the forward model and the reverse model look-up tables both comprise a grid of cells in their respective color spaces with entries at each grid point of the grid, the method comprising the following steps to determine an entry in the reverse model look-up table for a device independent target color:

performing a binary search of the forward model look-up table to locate a cell that contains the device independent target color;

interpolating entries from the forward model look-up table at grid points that define the cell so as to obtain device dependent colors corresponding to the device independent target color; and

storing the device dependent color at the grid point of the reverse model look-up table for the device independent target color.

2. (Unamended From Previous Version) A method according to Claim 1, wherein said interpolating step comprises tetrahedral interpolation.

3. (Unamended From Previous Version) A method according to Claim 1, wherein said step of performing a binary search comprises iterated steps starting from a starting color value in device dependent color space, the iterated steps comprising:

dividing the device independent color space into multiple regions defined by device independent colors corresponding to small variations from the starting color in device dependent color space;

determining which of the multiple regions contains the device independent target color; and

updating the starting color value based on which region contains the device independent target color.

4. (Unamended From Previous Version) A method according to Claim 3, wherein said step of determining which of the multiple regions contains the device independent target color comprises the steps of obtaining dot products for each normal plane vector that defines the multiple regions with the vector that defines the difference between the target color and the device independent color corresponding to the starting color, and determining which region contains the device independent target color in accordance with which of the dot products yields positive values and which yields negative values.

5. (Unamended From Previous Version) A method according to Claim 1, wherein the device independent color space is CIEXYZ or CIELAB color space, and wherein the device dependent color space is CMY or CMYK color space.

6. (Unamended From Previous Version) A method according to Claim 1, wherein the forward model look-up table is derived by printing color patches corresponding to predefined colors in device dependent color space, and measuring the colors of the patches in device independent color space.

6. ~~(Amended) A method according to Claim 6, wherein the predefined colors are in CMY or CMYK space, and the colors are measured in CIEXYZ or CIELAB space.~~

8. (Unamended From Previous Version) An apparatus for deriving a reverse model look-up table whose entries represent device dependent colors as a function of device independent colors, based on a forward model look-up table whose entries represent device independent colors obtained in response to printout of corresponding device dependent color components, wherein the forward model and the reverse model look-up tables both comprise a grid of cells in their respective color spaces with entries at each grid point of the grid, the apparatus comprising the following means to determine an entry in the reverse model look-up table for a device independent target color:

search performing means for performing a binary search of the forward model look-up table to locate a cell that contains the device independent target color;

interpolating means for interpolating entries from the forward model look-up table at grid points that define the cell so as to obtain device dependent colors corresponding to the device independent target color; and

storing means for storing the device dependent color at the grid point of the reverse model look-up table for the device independent target color.

9. (Unamended From Previous Version) An apparatus according to Claim 8, wherein said interpolating means comprises means for performing tetrahedral interpolation.

10. (Unamended From Previous Version) An apparatus according to Claim 8, wherein said search performing means comprises means for performing iterated steps starting from a starting color value in device dependent color space, the iterated steps comprising:

dividing the device independent color space into multiple regions defined by device independent colors corresponding to small variations from the starting color in device dependent color space;

determining which of the multiple regions contains the device independent target color; and

updating the starting color value based on which region contains the device independent target color.

11. (Unamended From Previous Version) An apparatus according to Claim 10, wherein said determining means comprises means for obtaining dot products for each normal plane vector that defines the multiple regions with the vector that defines the

difference between the target color and the device independent color corresponding to the starting color, and determining which region contains the device independent target color in accordance with which of the dot products yields positive values and which yields negative values.

12. (Unamended From Previous Version) An apparatus according to Claim 8, wherein the device independent color space is CIEXYZ or CIELAB color space, and wherein the device dependent color space is CMY or CMYK color space.

13. (Unamended From Previous Version) An apparatus according to Claim 8, wherein the forward model look-up table is derived by printing color patches corresponding to predefined colors in device dependent color space, and measuring the colors of the patches in device independent color space.

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~~14. (Amended) An apparatus according to Claim 13, wherein the predefined colors are in CMY or CMYK space, and the colors are measured in CIEXYZ or CIELAB space.~~

15. (Unamended From Previous Version) Computer-executable process steps stored on a computer-readable medium, the computer executable process steps to derive a reverse model look-up table whose entries represent device dependent colors as a function of device independent colors, based on a forward model look-up table whose

entries represent device independent colors obtained in response to printout of corresponding device dependent color components, wherein the forward model and the reverse model look-up tables both comprise a grid of cells in their respective color spaces with entries at each grid point of the grid, the computer-executable process steps comprising the following codes to determine an entry in the reverse model look-up table for a device independent target color:

code to perform a binary search of the forward model look-up table to locate a cell that contains the device independent target color;

code to interpolate entries from the forward model look-up table at grid points that define the cell so as to obtain device dependent colors corresponding to the device independent target color; and

code to store the device dependent color at the grid point of the reverse model look-up table for the device independent target color.

16. (Unamended From Previous Version) Computer-executable process steps according to Claim 15, wherein said code to interpolate comprises code to perform tetrahedral interpolation.

17. (Unamended From Previous Version) Computer-executable process steps according to Claim 15, wherein said code to perform a binary search comprises code to perform iterated steps starting from a starting color value in device dependent color space, the computer-executable process steps comprising:

code to divide the device independent color space into multiple regions defined by device independent colors corresponding to small variations from the starting color in device dependent color space;

code to determine which of the multiple regions contains the device independent target color; and

code to update the starting color value based on which region contains the device independent target color.

18. (Unamended From Previous Version) Computer-executable process steps according to Claim 17, wherein said code to determine comprises code to obtain dot products for each normal plane vector that defines the multiple regions with the vector that defines the difference between the target color and the device independent color corresponding to the starting color, and code to determine which region contains the device independent target color in accordance with which of the dot products yields positive values and which yields negative values.

19. (Unamended From Previous Version) Computer-executable process steps according to Claim 15, wherein the device independent color space is CIEXYZ or CIELAB color space, and wherein the device dependent color space is CMY or CMYK color space.

20. (Unamended From Previous Version) Computer-executable process steps according to Claim 15, wherein the forward model look-up table is derived by codes to print color patches corresponding to predefined colors in device dependent color space, and to measure the colors of the patches in device independent color space.

A3. ~~21. (Amended) Computer-executable process steps according to Claim 20, wherein the predefined colors are in CMY or CMYK space, and the colors are measured in CIE XYZ or CIE LAB space.~~

22. (Unamended From Previous Version) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to derive a reverse model look-up table whose entries represent device dependent colors as a function of device independent colors, based on a forward model look-up table whose entries represent device independent colors obtained in response to printout of corresponding device dependent color components, wherein the forward model and the reverse model look-up tables both comprise a grid of cells in their respective color spaces with entries at each grid point of the grid, the computer-executable process steps comprising the following steps to determine an entry in the reverse model look-up table for a device independent target color:

a search performing step to perform a binary search of the forward model look-up table to locate a cell that contains the device independent target color;

an interpolating step to interpolate entries from the forward model look-up table at grid points that define the cell so as to obtain device dependent colors corresponding to the device independent target color; and

a storing step to store the device dependent color at the grid point of the reverse model look-up table for the device independent target color.

23. (Unamended From Previous Version) A computer-readable medium according to Claim 22, wherein said interpolating step comprises tetrahedral interpolation.

24. (Unamended From Previous Version) A computer-readable medium according to Claim 22, wherein said search performing step comprises iterated steps starting from a starting color value in device dependent color space, the computer-executable process steps comprising:

a dividing step to divide the device independent color space into multiple regions defined by device independent colors corresponding to small variations from the starting color in device dependent color space;


a determining step to determine which of the multiple regions contains the device independent target color; and

an updating step to update the starting color value based on which region contains the device independent target color.

25. (Unamended From Previous Version) A computer-readable medium according to Claim 24, wherein said determining step comprises steps to obtain dot products for each normal plane vector that defines the multiple regions with the vector that defines the difference between the target color and the device independent color corresponding to the starting color, and to determine which region contains the device independent target color in accordance with which of the dot products yields positive values and which yields negative values.

26. (Unamended From Previous Version) A computer-readable medium according to Claim 22, wherein the device independent color space is CIEXYZ or CIELAB color space, and wherein the device dependent color space is CMY or CMYK color space.

27. (Unamended From Previous Version) A computer-readable medium according to Claim 22, wherein the forward model look-up table is derived by steps to print color patches corresponding to predefined colors in device dependent color space, and to measure the colors of the patches in device independent color space.

A4  28. ~~(Amended) A computer-readable medium according to Claim 27,~~
wherein the predefined colors are in CMY or CMYK space, and the colors are measured in ~~CIEXYZ or CIELAB~~ space.

29. (Unamended From Previous Version) An apparatus for deriving a reverse model look-up table whose entries represent device dependent colors as a function of device independent colors, based on a forward model look-up table whose entries represent device independent colors obtained in response to printout of corresponding device dependent color components, wherein the forward model and the reverse model look-up tables both comprise a grid of cells in their respective color spaces with entries at each grid point of the grid, the apparatus comprising:

a memory including a region for storing the forward model look-up table, a region for storing the reverse model look-up table, and a region for storing executable process steps; and

a processor for executing the executable process steps;

wherein the executable process steps include the following steps to determine an entry in the reverse model look-up table for a device independent target color:

(a) performing a binary search of the forward model look-up table to locate a cell that contains the device independent target color, (b) interpolating entries from the forward model look-up table at grid points that define the cell so as to obtain device dependent colors corresponding to the device independent target color, and (c) storing the device dependent color at the grid point of the reverse model look-up table for the device independent target color.